REMARKS / DISCUSSION OF ISSUES

The present amendment is submitted in response to the Office Action mailed August 5, 2009. Claims 1-10 remain in this application. Claim 1 has been amended. Claims 11-13 have been added. In view of the remarks to follow and amendments above, reconsideration and allowance of this application are respectfully requested.

Interview Summary

Applicants appreciate the courtesy granted to Applicant's attorney, Michael A. Scaturro (Reg. No. 51,356), during a telephonic interview conducted on Wednesday, November 4, 2009. During the telephonic interview, Applicant's attorney presented a proposed amendment to claim 1. Upon reviewing the proposed amendment, the Examiner stated that the claim, as amended, appeared to overcome the Tomie reference, however a further search would be required.

Claim Rejections under 35 USC 102

A. Rejection of Claims 1- 10

In the Office Action, Claims 1 – 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,251,492 ("Tomie"). Applicants respectfully traverse the rejections.

Claims 1-10 are allowable

Independent Claim 1 has been amended herein to better define Applicant's invention over Tomie. Claim 1 now recites limitations and/or features which are not disclosed by Tomie. Therefore, the cited portions of Tomie do not anticipate claim 1, because the cited portions of Tomie do not teach every element of claim 1. For example, the cited portions of Tomie do not disclose or suggest, "wherein a thermal barrier layer is arranged adjacent to said first dielectric layer opposite the mirror layer to reduce heat dissipation from the recording layer through the first recording layer thus allowing the thickness of the first dielectric layer to be chosen at said first amorphous reflection minimum (m=1), and wherein light entering the stack configured in the prescribed order penetrates the thermal barrier layer, the first and second dielectric layers and the recording layer, as recited in claim 1. In

contrast to claim 1, Tomie discloses an optical recording medium having a stack design that differs from the stack design of the present invention. Tomie discloses a stack arrangement of:

- recording stack,
- reflecting layer,
- thermal insulating layer,

While the invention discloses a stack arrangement of:

- thermal insulating layer,
- recording stack,
- reflecting layer.

The Office asserts that Tomie teaches the optical record carrier in the same form as claimed by Applicant in that the first dielectric layer and the thermal barrier layer can be one and the same and made of the same material ZnS-SiO_2. The Office asserts that Tomie teaches the claim limitation, "*wherein a thermal barrier layer (6 of Fig. 1, col. 3, lines 30-48) is arranged adjacent to said first dielectric layer opposite the mirror layer. (Fig. 1, col. 4, lines 47-51)".* It is respectfully submitted that Tomie merely discloses that the first (upper) dielectric layer may be made of the same material as the thermal barrier layer. See Tomie, col. 4, lines 47-51 and col. 5, lines 51-54. However, contrary to this assertion, there is no suggestion or teaching that the first dielectric layer and barrier layer are in fact one and the same. In fact, the only explicit teaching or suggestion in Tomie for using ZnS-SiO_2 as first and second dielectric layer materials is that the same material is preferred from a manufacturing control point of view. See, Tomie col. 4, line 63 – col. 5, lines 1-10. That is, Tomie does not teach or suggest the use of ZnS-SiO_2 as first dielectric layer material for the purpose of forming a thermal barrier.

> It is preferred that the thermally insulating layer is a layer of material ZnS-SiO_2 having a particularly small thermal conductivity and being a stable amorphous material which is difficult to crystallize by heat. Further, since a ZnS.cndot.SiO.sub.2 layer is

used for the lower and upper dielectric layers in the phase change-type optical recording medium, use of the same material in both the thermally insulating layer **and the dielectric layers is also preferred from the manufacturing control point of view**. A ZnS.cndot.SiO.sub.2 layer may be obtained by sputtering a mixture of ZnS and SiO.sub.2 with a molar ratio of about 8:2.

The object of the present invention is to provide a rewritable optical record carrier with a stack design which, at the same time, provides good optical properties and sufficient thermal protection of the adjacent substrate or cover layer on the light incident side. To achieve this objective, the present invention adds a thermal barrier layer arranged adjacent to the first dielectric layer. The effect is **a reduction of the heat dissipation eminating from the recording layer and passing through the first dielectric layer to the substrate/cover layer**. This allows an improvement in the optical performance of the optical medium. For example, in case of a short wavelength BD-system, the numerical aperture is very high (NA = 0.85). Therefore, the effective light path through the first dielectric layer significantly varies. Different light paths cause a phase shift and hence, deterioration of the optical performance. Adding a thermal barrier layer between the first dielectric layer and the substrate/cover layer allows choosing the first dielectric layer as thin as possible, or in the sense of reflection minima, to choose as the first dielectric layer's thickness d_1 at the first amorphous reflection minimum (m=1), where m is an integer, in order to enhance the optical contrast. See Applicant's specification, pages 2-3. For example, Applicant's specification recites in part at page 2:

> As can be Seen in Fig. 3, the optical performance periodically depends on the first dielectric layer thickness d_1. In particular, the amorphous and the crystalline reflection has minimum and maximum levels at certain d_1 values. The periodicity can be denoted as follows
>
> $$d_1 = (m*\lambda)/(2*n) \quad (1)$$
>
> wherein m is an integer, λ denotes the wavelength of the laser light, and n is the refractive index of the I_1 layer material.

. Accordingly, claim 1 has been amended to recite in relevant part –

> *wherein a thermal barrier layer is arranged adjacent to said first dielectric layer opposite the mirror layer to reduce heat dissipation eminating from the*

recording layer and passing through the first dielectric layer thus allowing the thickness of the first dielectric layer to be chosen at said first amorphous reflection minimum,

Although Tomie discloses that the stack arrangement includes a thermal insulator layer, Tomie does not teach or suggest how such a thermal insulator layer can be used to enhance the optical performance.

Since **Tomie avoids light penetrating the thermal insulator**, no motivation could be expected from Tomie to improve the optical performance by an arrangement according to claim 1. Accordingly, claim 1 has been further amended to recite in relevant part –

wherein light entering the stack configured in the prescribed order penetrates the thermal barrier layer, the first and second dielectric layers and the recording layer.

According to the stack arrangement of Tomie, as light enters the stack from the second (upper) dielectric layer 6 side, **the light does not penetrate the thermal insulating layer**. The intention of this arrangement is to protect the substrate. Tomie teaches that by inserting a thermally insulating layer of a dielectric material between the plastic substrate and the reflecting layer, elevation of the temperature of the plastic substrate to a temperature higher than the thermal deformation temperature of the plastic substrate is avoided. See Tomie, col. 3, lines 1-15. Tomie discloses that the thermally insulating layer used should have a low thermal conductivity and a thickness greater than a certain value. See Tomie, col. 4, lines 12-14. Tomie further discloses that the problem of temperature elevation is overcome if heat in the reflecting layer only diffuses in the reflecting layer in the layer face direction and is not conducted to the substrate in the thickness direction. Therefore, the thermal conductivity of the thermally insulating layer should be determined based on the relationship with the thermal conductivity of the reflecting layer. See Tomie, col. 4, lines 22-30. Tomie describes various materials for use as the thermally insulating layer. See Tomie, col. 4, lines 46-50 and col. 4, lines 63-67.

It is respectfully submitted that Tomie describes in great detail the thickness properties of the thermally insulating layer in overcoming the problem of temperature elevation of the substrate layer. There is no equivalent recitation regarding the thickness properties of the first dielectric layer for overcoming temperature elevation. In fact, Tomie provides a range, however, the range is not particularly limited, as stated in Tomie. See Tomie, col. 5, lines 55-60:

> The thickness of the lower dielectric layer is typically in a range of 25 to 60 nm, although it is not particularly limited in the present invention. The thickness of the upper dielectric layer is typically in a range of 30 to 200 nm, although it is not particularly limited in the present invention.

New Claims 11-13 are allowable

New claims 11-13 are allowable at least by virtue of their dependence from claim 1. In addition, claims 11-13 recite additional elements not disclosed or suggested by the above-cited reference.

For example, claim 11 recites an equation for representing the thickness of the first dielectric layer as a function of λ which denotes the wavelength of the laser light, and n which denotes the refractive index of the first dielectric layer material and m is an integer.

As a further example, claims 12 and 13 recited that the amorphous and a crystalline reflections have minimum and maximum levels at certain d_1 values and that the amorphous reflection has a minimum value at m=1, as shown in equation 1.

Thus, the cited portions of Tomie fail to disclose or suggest the above features. Thus, new claims 11-13 are allowable.

Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that all claims presently pending in the application, namely, Claims 1-13 are believed to be in condition for allowance and patentably distinguishable over the art of record.

If the Examiner should have any questions concerning this communication or feels that an interview would be helpful, the Examiner is requested to call Mike Belk, Esq., Intellectual Property Counsel, Philips Electronics North America, at 914-945-6000.

Respectfully submitted,

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